

What is claimed is :

1. A multilayer structure on a bottom of a contact hole, said multilayer structure comprising a titanium film on a silicon region and a titanium nitride film on said titanium film,

wherein said titanium nitride film has a compressive stress of not higher than 5×10^9 dyne/cm² so that said titanium film has such a high stability as preventing any crack upon changing said compressive stress to a tensile stress by a heat treatment.

2. The multilayer structure as claimed in claim 1, wherein said compressive stress of said titanium nitride film is not higher than 3×10^9 dyne/cm².

3. The multilayer structure as claimed in claim 1, wherein said titanium nitride film is mainly oriented in a (200)-face.

4. The multilayer structure as claimed in claim 1, wherein said contact hole has an aspect ratio of not less than 4.

5. The multilayer structure as claimed in claim 4, wherein said contact hole has an aspect ratio of not less than 5.

6. A contact plug structure in a contact hole in an inter-layer insulator on a silicon substrate, said contact plug structure comprising :

a titanium film on a bottom and a side wall of said contact hole ;

a titanium nitride film on said titanium film ;

a metal plug on said titanium nitride film so that said metal plug buries said contact hole ; and

a titanium silicide layer in a surface region of said silicon substrate and in contact with a bottom of said contact hole,

wherein said titanium nitride film free of any crack and has a tensile stress of not higher than 3×10^9 dyne/cm².

7. The contact plug structure as claimed in claim 6, wherein said tensile stress of said titanium nitride film is not higher than 2×10^9

dyne/cm².

8. The contact plug structure as claimed in claim 6, wherein said titanium nitride film is mainly oriented in a (200)-face.

9. The contact plug structure as claimed in claim 6, wherein said contact hole has an aspect ratio of not less than 4.

10. The contact plug structure as claimed in claim 9, wherein said contact hole has an aspect ratio of not less than 5.